$\qquad$ Roll No. $\square$

## B.TECH. <br> (SEM I) THEORY EXAMINATION 2018-19 PROGRAMMING FOR PROBLEM SOLVING

Time: 3 Hours
Total Marks: 100
Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

## SECTION A

1. Attempt all questions in brief.
$2 \times 10=20$

| Qn. | Question | Marks | CO |
| :---: | :---: | :---: | :---: |
| a. | What is the difference between compiler and Interpreter? | 2 | Col |
| b. | What are the good characteristics of an algorithm? | 2 |  |
| c. | What do you mean by scope and lifetime of a variable? | 2 |  |
| d. | Write a recursive function in C, which takes an input from user to calculate a factorial using the recursion concept. | 2 |  |
| e. | How to use break statement in C? Explain with some sort of code. | 2 |  |
| f. | What do you mean by precedence and associativity while solving some arithmetic expressions? | 2 |  |
| g . | While compiling a code, write the name of two syntax and two logical errors. | 2 |  |
| h. | What is an array? In which situation array is advantageous over linked list? | 2 |  |
| 1. | What is linked list? Write the self-referential structure of a node in linked list? |  |  |
| j. | Write the difference between structure and union. | 2 |  |
| k. | Draw the memory hierarchical structure of computer system. | 2 | CO1 |

## SECTION B

## 2. Attempt any three of the following:

| a. | Explain linear search and binary search technique for searching an item <br> in a given array. Also write the complexity for each searching technique. | 10 | CO4 |
| :--- | :--- | :--- | :--- |
| b. | A certain grade of steel is graded according to the following conditions: <br> i. Hardness must be greater than 50 <br> ii. $\quad$ Carbon content must be less than 0.7. <br> iii. Tensile strength must be less than 5600 | 10 | C03 |
| The grades are as follows: |  |  |  |
| Grade is 10 if all the three conditions are met. |  |  |  |
| Grade is 9 if condition (i) and (ii) are met |  |  |  |
| Grade is 8 if condition (ii) and (iii) are met |  |  |  |
| Grade is 7 if condition (i) and (iii) are met |  |  |  |
| Grade is 6 if only one condition is met. |  |  |  |
| Grade is 5 if none of the conditions are met. |  |  |  |
| Write a program, which will require the user to give values of hardness, |  |  |  |
| carbon content and tensile strength of the steel under consideration and |  |  |  |
| output the grade of the steel. |  |  |  |$\quad$|  |  |
| :--- | :--- |


| c. | What do you mean by call by value and call by reference? Write an <br> algorithm for swapping two numbers using call by reference technique. <br> Also write a C program for the above stated algorithm. | 10 | CO5 |
| :--- | :--- | :--- | :--- |
| d. | Explain Selection sort technique for sorting problem. Also write an <br> algorithm for selection sort. Sort the following numbers using selection <br> sort technique. 26,54,93,17,77,31,44,55,20 | 10 | $\mathrm{CO2}$ |
| e. | Write a short note on following preprocessor directives with example: <br> i. Macro Expansion <br> ii. File Inclusion | 10 | C05 |

## SECTION C

## 3. Attempt any one part of the following:

| a. | Describe the basic components of computer system with neat and clean <br> block diagram. What do you mean by operating system? Ex | 10 | CO1 |
| :--- | :--- | :--- | :--- |
| b. | Defined data types in C. Discuss primitive data types in terms of <br> memory occupied, format specifier and range. | 10 | CO1 |

## 4. Attempt any one part of the following:

| a. | Explain various types of arithmetic operators in C language with help of <br> example. When precedence of two operators in an arithmetic expression <br> is same, how associativity helps in identifying which operator will be <br> evaluated first. Illustrate it with the example. | 10 | $\mathrm{CO1}$ |
| :--- | :--- | :--- | :--- |
| b. | What is case control structure in C.? What is the reason for using break <br> statement at the end of each case in case control block? | 10 | $\mathrm{CO1}$ |

5. Attempt any one part of the following:

| Qn. | Question |  | Mark |
| :--- | :--- | :--- | :--- |
| CO |  |  |  |

6. Attempt any one part of the following:

| a. | Write short notes on following. <br> 1. Enumerated Data Type <br> 2. String | 10 | CO |
| :--- | :--- | :--- | :--- |
| b. | What do you mean by order of complexity? Explain various notions to <br> represent order of complexity with diagram | 10 | $\mathrm{CO2}$ |

## 7. Attempt any one part of the following:

| a. | What is dynamic memory allocation? Explain the calloc(), malloc(), <br> realloc() and free() functions in detail. What is lifetime of a variable, <br> which is created dynamically? | 10 | CO5 |
| :--- | :--- | :--- | :--- |
| b. | Explain command line arguments in C with the help of example. | 10 | CO5 |

